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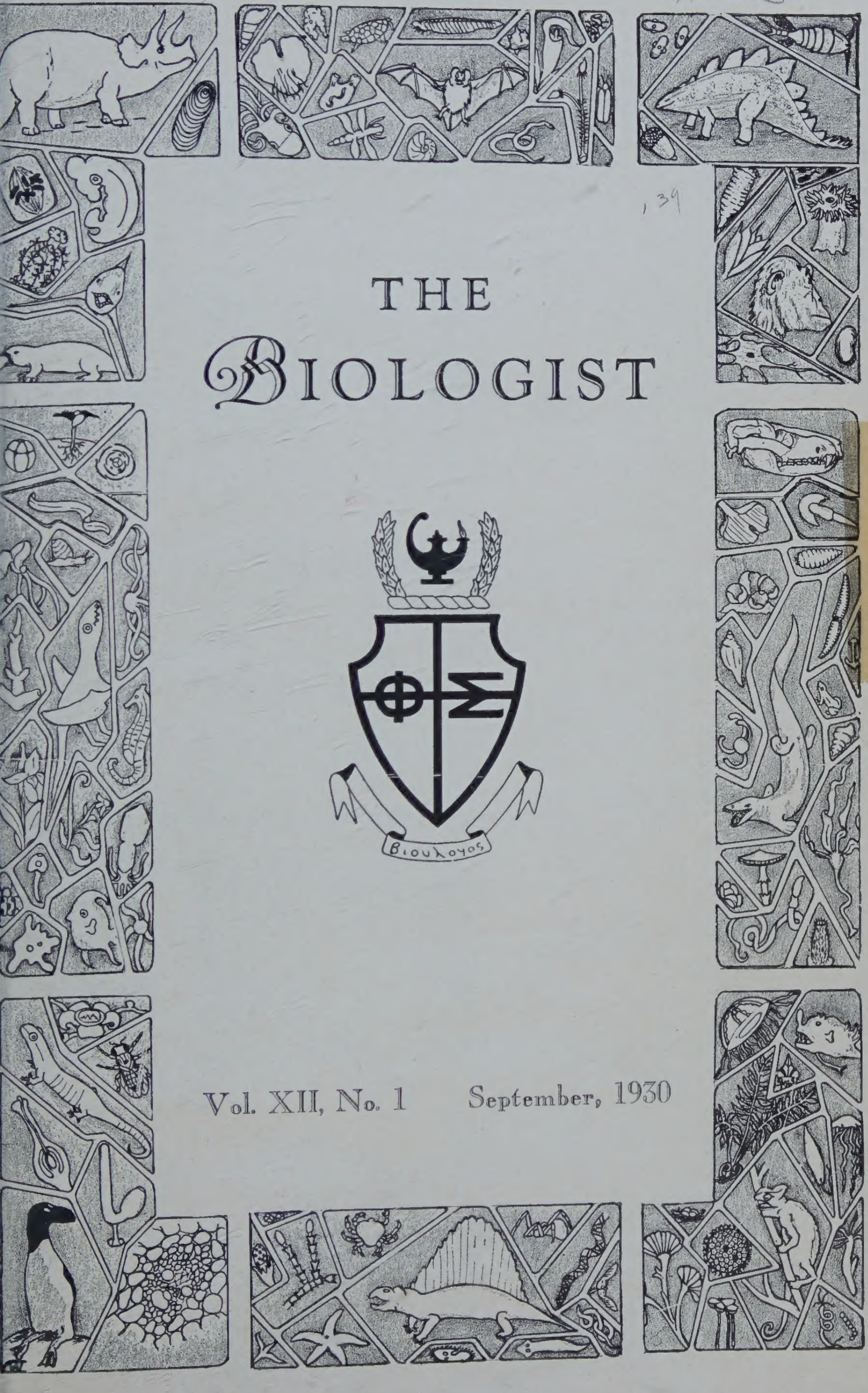

THE BIOLOGIST

Βιουλογος

Vol. XII, No. 1 September, 1930

THE BIOLOGIST

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OFFICIAL QUARTERLY PUBLICATION

OF THE

PHI SIGMA SOCIETY

Volume XII Denver, Colorado, September, 1930 Number 1

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PHI SIGMA SOCIETY

An Organization Devoted to the Promotion of Interest in Research
in the Biological Sciences, Founded Ohio State
University, March 17, 1915.

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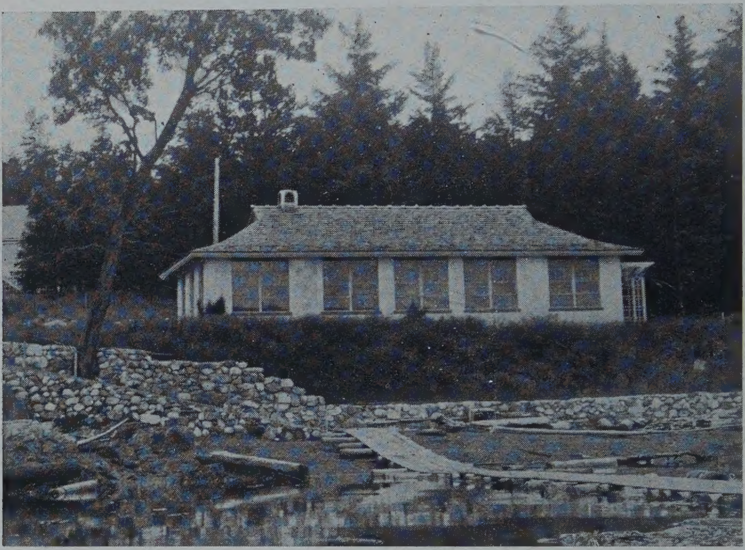
Puget Sound Biological Station

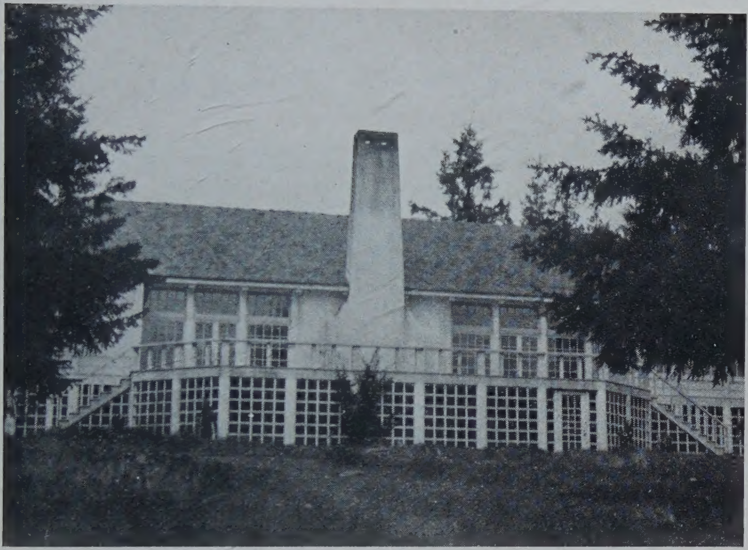
General View of the Station

Looking West to the Laboratories



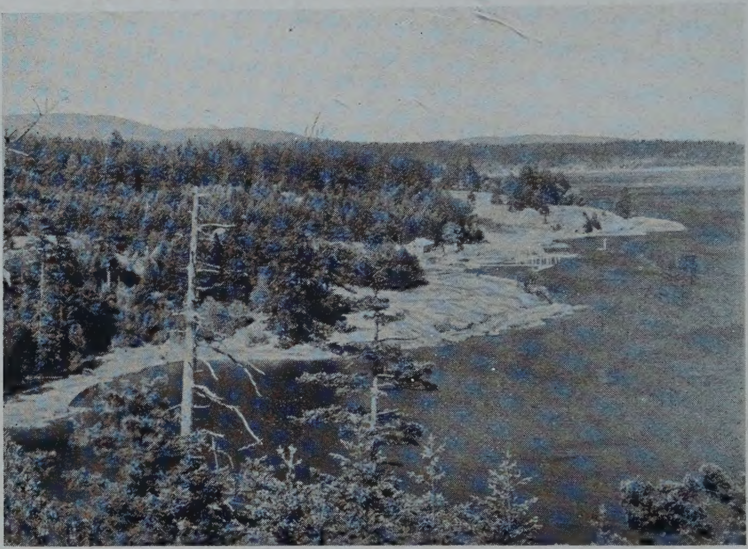
The Embryology Laboratory as seen from the Float

Porch and Doorway of the Botany Laboratory

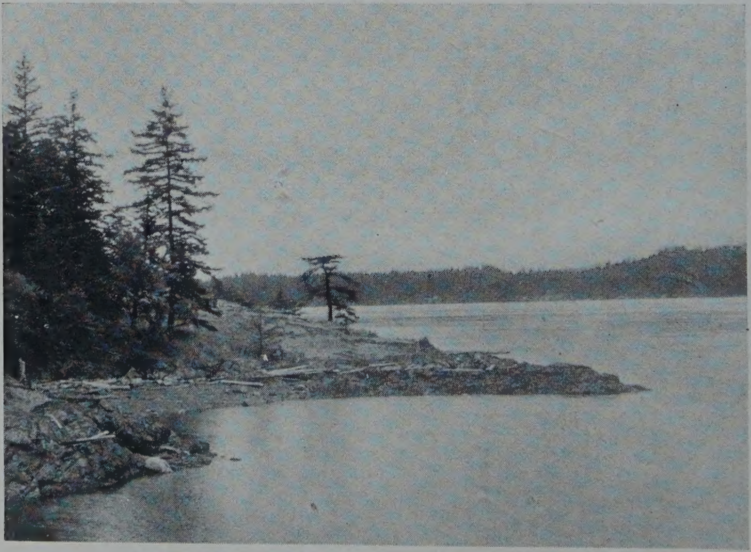


FRONT PORCH OF THE DINING HALL

THE DREDGE ALONGSIDE THE FLOAT.



Looking East Along the Station Shoreline



Rocky Point and Bay

THE BIOLOGIST

Volume XII September, 1930 Number 1

The Puget Sound Biological Station

By Lyman D. Phifer *and* Margaret W. Phifer

I

The Puget Sound Biological Station has reached another turning point in its growth and it seems particularly fitting at this time to record briefly somewhat of its beginnings and early years, of its status today, and of the recent changes which will enlarge the scope of marine research it makes possible here in the Northwest.

The Station is beautifully located near Friday Harbor, on San Juan Island, the longest of the group of 175 islands and reefs that comprise most of the San Juan Archipelago and also of San Juan County of the State of Washington. The islands are about a hundred miles northwest of Seattle and lie in the path of the waters that ebb and flow in and out of the Gulf of Georgia and the Puget Sound Basin.

Seeing the Biological Station as it stands today, trim, red-roofed buildings outlined against dark green firs and pines, one can scarcely realize the humble and rather recent beginnings of what is fast becoming a world-known biological laboratory. Its incipiency reaches back only to the 1880's and 1890's when sons of some of the early settlers of Seattle grouped themselves into the Young Naturalists' Society. The members of this society, under the tutelage of Professor O. B. Johnson of the University of Washington, collected rocks, tried their hands at taxidermy, and named plants and animals. In the summer of 1895 Professor Johnson had a camp for them at Rocky Point on Puget Sound; in 1896 the Society organized a camp at Port Townsend, for which the University furnished a little money and a few students.

Two of the veteran members, Trevor Kincaid, instructor in zoology, and H. H. Hindshaw, curator of the museum of the University, had urged the founding of a biological station. Their efforts were given added impetus when in 1900 a party from the University of Minnesota, while looking for a station site, stayed at Friday Harbor for a week, and later spent a summer at Point San Juan, Vancouver Island, B. C.; also in 1903 Columbia University organized a temporary station at Port Townsend for the collection of marine animals. That same summer, at the request of the University, Professor Kincaid explored the shores of Puget Sound in a small launch, hunting for a good location. Finally, he was impressed with the wealth of marine fauna and flora at Friday Harbor, and decided that it was an ideal place for a station.

In the summer of 1904 Dr. T. C. Frye, who came to the Botany Department of the University in the fall of 1903, Professor Kincaid, and about 15 others spent six weeks at Friday Harbor. Everyone lived in unfloored tents and the cooking was a sort of community affair. The laboratory was a big rough table under a large fir tree. However, this deficiency of equipment was not greatly felt because most of the time was spent in taking three- or four-day exploring excursions among the islands. All dredging of the sea bottom was done from a small fish scow with a shallow dredge which had to be let down and pulled up by hand. No formal class work was offered; everyone collected and classified to suit himself. A diary, still extant, speaks little of their work but much more of the trials attending their primitive life. But this was a beginning.

In 1905 no better camp site was available, but from 1906 through 1908 the Marine Station, as it was called, became affluent to the extent of a roof, four walls, and a floor—an abandoned fish cannery on one of the village docks. Here was shelter from rain and wind, all the space dear to a collector's heart for drying, mounting, pressing, or drawing of his finds. But of real scientific equipment there was none. Perhaps it is not unfair to say that little equipment was needed; the six-weeks session was scarcely long enough to collect and name the beautiful and various flora and fauna. However, as the students increased in number it became possible to organize one class each in botany and zoology, both being elementary taxonomy and morphology.

In 1909 Washington State College, of Pullman, had a summer camp at Olga, Orcas Island. It seemed a good idea that the two camps should combine forces, so everyone spent three weeks at Friday Harbor and three at Olga. However, the experiment was a failure. Because the old cannery had been sold, the Station had to move into tent quarters again, and naturally there was was not enough space. When camp was just fairly settled, it was time to pull up stakes and go to Olga. And it rained discouragingly. Then before everyone was dried out and again in good spirits it was time to go home.

It was evident that unless changes were made, work would have to be abandoned. There was need of more variety in the class work; scientific equipment was needed to strengthen it. Permanent buildings were the first necessity. Mr. Andrew Newhall, an enterprising citizen of Friday Harbor, made possible the initiation of a new program by offering the University about four acres of land on the steep shore about half a mile from town, providing that the University should erect buildings to be used for biological purposes. Accordingly building was begun in the fall of 1909. A large frame laboratory was erected just above high tide line. It contained laboratories, research rooms, a stockroom, and a general lecture room. Above the laboratory was then built a large dining hall with a kitchen annex. Perhaps the dearest memories of those attending the Station during the next 13 years revolve about this great room with its huge, rough stone fireplace, and the rude front balcony from which one could gaze across the water and neighboring islands to the ever-changing colors and shadows on Mount Baker and the Cascade range. In this room students and professors gathered as one large family to eat at the rough 12-foot tables with their long benches, to study from the books of the gradually increasing library, to listen to the evening lectures, or to romp at Friday night parties or the annual Stunt-Nite. All lived in tents perched on the slope, girls on one side of the dining hall and boys on the other, but these tents were floored and boarded half-way up. The beds were wobbly and the mattresses lumpy, but who cared? Everyone entered into the simple life whole-heartedly.

In 1910 Professor Kincaid was appointed the first official director, which position he held until 1914 when he undertook work in the oyster beds of Washington. He deserves much credit for the tenacity and cheerful optimism with which he pulled the young institution through its first precarious years. Under him the attendance gradually increased to about 70, and several courses were added.

In 1914 Dr. Frye took over the reins and has held them since. By this time the Station was well under way, and it was Dr. Frye's hope to make the place known over the world, as well as to render it of real value to the schools and coming generations of the Northwest. To carry out the latter purpose it was necessary to interest and prepare grade- and high-school teachers for the teaching of biology. To this end both elementary and advanced courses were offered. Teachers from the Middle West and the East were brought each year, to stimulate the interest of other universities. This work also helped prepare students for research, Dr. Frye's chief ambition for the Station. Likewise, to make the institution known, it was necessary to publish the papers of research workers. Consequently a series of publications was begun in 1915.

During the Great War the name was changed to Puget Sound Biological Station because of confusion in the mails with the Marine Station and Navy Yard at Port Townsend and Bremerton near Seattle. Of course the War inhibited the Station's growth; attendance fell off to about 35 in 1918 and there was less money than ever to provide needed equipment. However, a new lease on life was coming.

Those who attended the Station from 1920 on will remember how often Dr. Frye spoke of the expansion he hoped soon to see. As early as 1915 it had been apparent to him that a new location would be necessary sometime. Nearly an acre of the grounds had been eaten up by a county highway; more space was needed to accommodate the increasing number of students; continual running up and down the steep slope was burdensome; more than all this the drift of the tide brought down contamination from the fish cannery and the town. Negotiations had been begun for the obtaining of the unused military reservation north of, and two miles by road from Friday Harbor, but it was not until 1922 that the Government finally gave the land to the University.

The grounds consist of 484 acres with about two miles of rocky shore, indented here and there with small gravel beaches. The tract is rather heavily wooded with a conifer forest in which are a few patches of deciduous trees. The rock is very near the surface and outcrops are common.

The dream of permanent fireproof buildings which could adequately house the scientific equipment and the students was becoming a reality, though slowly, for the State could not at once appropriate funds for all necessary buildings. It was decided that the new station be built on the unit plan, that is, a separate building for each class. Accordingly, in the fall of 1923 and the spring of 1924, two laboratories, a dining hall, and a curator's cottage were erected. The laboratories are one-story structures of stuccoed hollow tile and red tile roofs. Each measures about 24 by 56 feet and consists of professor's office, storeroom, research room, and general laboratory. Facing the windows of the latter are large built-in tables which will accommodate 20 students. Down the center of the room is a row of concrete sinks with running fresh and salt water.

The huge frame dining hall is about 35 by 85 feet and has a seating capacity of 200. In the center of the south side is a great brick fireplace which veritably warms the whole room. The green chairs and round green tables, which seat 6, also brighten the place. In the wings at either end is the library. On the north side are the cement-floored kitchen and lavatories.

That first year on the new grounds was an ordeal. The attendance was the largest it had ever been; the dining hall floor had yet to be laid when the session began, so the first few meals were eaten outdoors; for lack of space, some classes had to do their work at the old laboratory and were ferried back and forth. That Dr. Frye's huge family kept peaceful and busy was a tribute to his cheerful, quieting personality.

In the spring of 1925 two more units were constructed, so that the old site could be abandoned, though still more space was needed. Some laboratories had to care for two classes, and the elementary courses and the research workers had to be housed in tents that were uninhabitable on cold or rainy days.

At this time Dr. Frye was able to interest Bellingham State Normal School in his wish to prepare grade teachers for the teaching of biology to children. Accordingly the Normal taught two elementary classes, one in botany and one in zoology, adapting the work to its own ends, and paying the instructors.

Another step forward was the lengthening of the session to nine weeks in 1926, a step toward keeping the Station open for work just as long as the weather permits.

In 1928 three more units and a director's cottage were built. No buildings have gone up since. To date, then, there are ten buildings on the grounds. Five class laboratories and a research laboratory, the latter consisting of ten separate rooms, skirt the shoreline. Farther up from shore are the curator's cottage, the dining hall, the stockroom (which can be converted into a laboratory if need be), the director's cottage, and the 100 tents.

Since the plan has been to have the equipment and supplies most needed in the lines of work offered, the scientific equipment is of a general nature. At the stockroom ordinary compound microscopes, general glassware, preservatives, chemicals, paper, etc., may be obtained. Research workers sometimes need to bring their own special apparatus, although by writing to the Director, it is usually possible to obtain such supplies from the University.

Because of lack of funds, the growth of the Station Library has been slow. At present it contains about 3300 volumes, most of which are bound periodicals and separates. Some of the periodicals and reports have been received in exchange for our own publications. It now requires the full time of a librarian to care for the library and to establish new exchanges.

Aside from caring for the Station in the winter, it has been the duty of the curator to collect and send out biological supplies to the high schools and colleges of the Northwest. Naturally, most of the specimens are marine forms. No consistent attempt has been made to make this department a money-making proposition, for in 1923 all of San Juan County was decreed a marine biological preserve by the State Legislature. Since commercial collectors are refused the right to obtain their specimens here, it has hardly seemed fair to do more than satisfy the needs of nearby schools at a nominal figure.

II

Life at the Station is simple and enjoyable. Strong reasons for this are the invigorating atmosphere and beautiful natural surroundings, for the weather is freshly mild and clear. Usually there is a little rain during the first part of the session but this merely adds variety to otherwise clear skies. It all inspires one with a joy in life, a deep breathing-in of new vigor after the stench of cities and heated winter houses. On shore, everywhere are tall green trees; off shore, everywhere green-blue sea—trees which bend and sigh in the winds, waters that rise and sink back in unceasing murmur. Looking across San Juan to the west one sees the great Olympics; far away to the east rise the cold blue Cascades, Mount Baker surmounting them in majestic grandeur.

It seems only fitting that in such surroundings living should be simple and free. Everyone lives in 10 x 12 tents that easily provide space for two persons (if neither brings more clothes than are necessary). Suitcases can readily be pushed under the beds, but a trunk is space-taking. Clothes vary; lately there has been a craze for overalls, but knickers are still attractive too. Besides these, however, shirts or blouses, a heavy sweater, boots and tennis shoes are needed, and one is quite prepared for whatever comes. Sometimes the girls feel the need of a change, in which case a gingham dress or two suffices. There simply isn't time to spend on dressing, and of course tents are notoriously poor places to keep good clothes. Also, the class work requires clothing suitable for field and water going, and one is in class most of the day. But the strongest argument for simplicity is the laundering. Almost everyone does his own—at the community wash tubs, and in the ironing tent, where electric irons are provided. Saturday is indeed the big cleaning day.

Simple living calls for but few rules. Dr. Frye has found that a few suggestions to everyone at the first of the term are sufficient to arouse in folks such a feeling for community welfare that seldom is there a need for decided ''don'ts'' and ''can'ts''. Furthermore, camp is much more peaceful and happy without a list of rules which seem ''made only to be broken.''

The center of Station social life is the dining hall, and the open hearth, where burn four-foot lengths of forest wood, is the center of the hall. Here on cool mornings and evenings many gather to partake of its warmth, and being warmed in body find themselves warmed in spirit. In this room everyone meets at least twice a day and after the first week or so, folks from many states and even foreign countries are loyal members of the large ''Bug'' family. To facilitate getting acquainted, a new seating list is posted each week, so that it is not often that one sits with the same person for more than a few days during the session. ''Old Bugs'' often dread the possible time when cafeteria service may have to be installed; it will then be much harder to avoid cliques and unfriendliness. The meals are managed by the University Commons and are still served family style. The food is wholesome and plentiful, and costs only $5.50 a week! About a dozen girls wait table for their board, and verily a good waitress is a most popular girl.

In this place is also that chief connection with extra-station life—the mail box. Letters, packages, bundles, papers—they weigh down the postman's car, and still the ''Bugs'' cry for more of them. At noon there is a rush to the dining room, then mingled looks of gladness and resignation as hopes are fulfilled and disappointed.

With the coming of dusk the dining hall, which empties so quickly after dinner, takes on new life. It is just after eight o'clock and the group about the piano has disbanded, so that the music won't disturb the workers. Those who aren't studying and using the library may be writing letters. Several inevitable bridge games get under way. Over there someone is teaching the game of ''42''. Some of the married women are chatting together while they do their needle-point. A favorite professor is the center of a listening group. And there by the crackling fire are a few who just sit and gaze into the flames.

Again, the bulletin board announces an illustrated evening lecture. The ringing of the bell at dusk is the signal for a gathering of all those interested. Usually each member of the faculty gives a talk at some time during the session. It may concern recent travels, meetings, or research, but all are given in a more or less informal style.

Friday or Saturday evenings are gala occasions for the dining hall. An appointed committee arranges music and fun for a dance or party. Sometimes only the younger ones come to dance, although for a special party nearly all the Stationites put in an appearance. Perhaps it is a Hobo Informal, a Kid Party, a Barn Dance, or a Masquerade. Traditionally there has always been a Stunt-Nite, a vaudeville with each class putting on an act. However, with the increase in attendance it has become more difficult to make this a time when everyone can take part. As the years go on, this problem of entertainment takes care of itself if a group of responsible ''Bugs'' keep an ear open to the wishes of the majority.

There is also plenty of opportunity for outdoor activity. The grounds are extensive enough to afford pleasant walks, even hikes, to points of interest. ''Heaven'', the highest point on the reservation, by path about a mile from camp, gives a delightful view of neighboring islands across San Juan Channel. ''Fern Cave'', three-quarters of a mile away, is a natural home of many maidenhair ferns.

Nearly every evening there is an indoor-baseball game on a field west of the dining hall. Faculty, as well as men and women students, are welcome to take part—the more the merrier. The interest never seems to lag. Of late years, an organized game between married and single men has provided excitement on Fourth of July afternoon.

Those who would indulge in less strenuous sport may pitch horseshoes. And it must not be forgotten that there are some 20-odd rowboats in which to row to town, around Brown Island, or to various Station beaches. The water near the station is too cold for prolonged swimming, but a dip now and then is invigorating. Occasionally it is possible to go to shallow bays or lagoons where the water is comfortably warm.

For those who come from inland, it is sometimes possible to arrange trips to the fish traps on the south side of San Juan, when the nets are disgorged of their seething, silvery burdens. Perhaps a fish may be purchased and taken back to camp and roasted over a campfire on the beach. Clams, pectens, and crabs are also delectable morsels, especially when taken hot from a kettle over a beach wood fire, while the rising tide laps nearer and nearer.

On Sundays, when the boat for dredging is not used for work, a picnic lunch is provided for those who wish to travel to interesting spots among the islands. Everyone climbs aboard at the appointed time, fortified with sun hats, dark glasses, perhaps a magazine or two, prepared to enjoy the boat trip by talking, reading, singing, or just looking. After an average run of about two hours, all disembark, sometimes to visit the glacial hill and wind-swept areas of Cattle Point near which is a wonderful salt water lagoon; perhaps to wander around at Iceberg Point on Lopez Island to see the large areas of country rock with the glacial grooving and striations; again to dig in the cretaceous fossil beds on Spieden or Waldron; or to see the sea gull and cormorant nests and cactus on Gull Rock and Flat Top. A study of the islands as a whole reveals interesting ecological problems in plant succession.

The one over-night trip is to Mount Constitution on Orcas. After landing on a Saturday at Olga, a climb of some five or six miles to an elevation of 2400 feet brings one to the highest point on the islands. Here a gorgeous panorama spreads out before one, from the distant western mountains of Canada, down to the most northern islands of the San Juan group, and eastward to the city of Bellingham which seems to nestle at the feet of magnificent Mount Baker. The descent is made on Sunday to East Sound where the boat meets the crowd of hot weary stragglers. As they finally round the point for home, all are looking forward to a good hot bath and dinner, (a different feeling than that with which they left the day before!) the first verse and chorus of the Station song may be heard:

Oh, we came to Friday Harbor,
Just to work a little harder,
  Singing paddle, paddle, paddle all the way;
The native shrugs,
And calls us Bugs,
  Sing paddle, paddle, paddle all the way.
Fare thee well, fare thee well,
Fare thee well old Station float,
For we're off to do collectin',
Just to get a pail of pecten,
Singing paddle, paddle, paddle all the way.

III

However fascinating social life at the Station might seem as an end in itself, it is always subsidiary to study and work, the real functions of the place.

The developmental program, particularly during the last ten years, has been based on the three aims of Dr. Frye: first, to instruct grade school teachers in the fundamentals of biology so that they in turn may create and foster interest in biology in the children under them; second, to create the opportunity for those interested to receive instruction in advanced undergraduate studies pertaining to marine biology; third, to make laboratory space and equipment available for investigators who wish to work on marine biological problems.

The first of these three aims is unique. To the writers' knowledge it is the first time instruction in marine biology has been offered to elementary teachers in a public school system. It is an attempt to create a science-consciousness in the minds of future students of the sea. This idea led to the cooperation of the Station with the State Normal School in Bellingham in the giving of two courses, plant biology and animal biology, each giving 13 quarter hours of Normal School credit.

In order to offer the advanced undergraduate opportunity for instruction, various courses built around the abundant supply of local animal and plant forms have grown up. This class work is carried on in the customary university procedure of lecture and laboratory under the direction of a professor and one or two laboratory assistants. The proportion of class hours spent in the field varies, of course, with the subject studied. The emphasis of the work, however, is always placed on direct contact with living specimens, a dynamic approach to the subject. Students of inland institutions may profit greatly by a summer's contact with the marine flora and fauna, which otherwise would probably be studied only from the preserved materials. Classes usually collect the forms to be studied while on field trips along the shore, in row boats, or, in the case of deep water forms, on the dredge. The opportunity provided for one to study marine life in an area so richly and variously endowed cannot readily be overestimated. Furthermore, the instructors of the courses are men who are outstanding in their fields.

The scope of this class work and the quality of the personnel may be fairly represented by a brief résumé of the classes given during the present summer session, June 16 to August 15, 1930:

Zoology 40. Animal Morphology. One or more than one species in the groups from the lowest to the highest is studied in detail; the diversity of form in the group is then illustrated by a less detailed comparative study of as many forms as time will permit. Given by Dr. Harry M. Miller, Associate Professor of Zoology, Washington University, St. Louis, Mo.

Zoology 150. Embryology. A study of the development of the marine animals, illustrating the types of embryos as far as possible. Given by Dr. J. E. Guberlet, Associate Professor of Zoology, University of Washington, Seattle.

Zoology 220. Animal Ecology. A study of the conditions of life in the sea, the distribution of marine animals, their habitats, and reactions to stimuli under natural and artificial conditions. Given by Dr. V. E. Shelford, Professor of Zoology, University of Illinois, Urbana, Illinois.

General Physiology 170. An introductory survey course dealing in a general way with vital activities of cells and organisms, with special reference to marine animals and plants. Given by Dr. E. J Lund, Professor of Zoology, University of Texas, Austin, Texas.

Botany 247. Diatoms. Study of the classification, morphology, and physiology of diatoms. Given by Dr. H. H. Gran, Professor of Botany, University of Oslo, Oslo, Norway.

Botany 250. Algae. Morphology, ecology, and taxonomy of the algae. Given by Dr. T. C. Frye, Professor of Botany, University of Washington, Seattle.

All registration is at the Station; it is very informal, and inexpensive, for $35.00 will more than cover all usual fees, other than living expenses. On the whole, students find it more practical to register for only one course, since the work is planned on that basis. Often students find it possible to carry on a small independent or semi-independent problem in the same field as that in which they are enrolled. A maximum of thirteen quarter hours, or 8½ semester hours of university credit may be earned during the nine week session by those devoting their whole time to their work. Credits earned may be transferred directly from the Station's books to other institutions.

In 1929 there was a total attendance of about 210, of which 150 were students. One-third of these were graduates doing either class work or research; nearly a third of them were Normal School students, a few having just graduated from high school. This year all students must have the equivalent of junior standing in the University, or better. However, this new ruling is not likely to lower the attendance markedly.

In these later years more and more emphasis has been laid on research, resulting in a notable increase in the laboratory space and equipment available for the ever larger number of investigators desiring to work at the Station. Generally speaking, both the professors and their assistants have approximately half of their time for research. At present work is being carried on in taxonomy and morphology of both plant and animal forms, embryology, animal ecology, general physiology, and the chemistry of the adjacent water bodies.

The Publications of the Station, which were begun for the purpose of printing reports of work done there, have grown to seven volumes. They now include accounts of biological research done both at the Station and at the University. They are sent, through subscription and exchange, to many libraries and institutions in the United States, and to practically all foreign nations.

IV

Last December Dr. Frye tendered his resignation as director, the same to take effect the first of October, 1930. To his unstinting efforts is due the growth of the Station during the last 15 years. And to those who have worked there under him his going will be felt as a distinct loss. His kind, fatherly interest in those who came and went will ever be part of their cherished Station memories.

Now a new program is under way. Recognizing the vast natural resources in marine life of this region and of the adjoining ocean areas. the Board of Regents of the University in March, 1930, authorized the foundation of the University of Washington Oceanographic Laboratories, appointing Dr. Thomas G. Thompson, of the Department of Chemistry, to the directorship. The Oceanographic Laboratories will include the present Puget Sound Biological Station at Friday Harbor and laboratories located on the University campus at Seattle.

In the future the elementary class work will be abandoned. Exceptional senior standing or better is required for student admission. The instruction given will be in the form of seminars held by various members of the staff, or visiting professors. Research in the biological, chemical, and physical phases of oceanography will be stressed.

The laboratories, both at Friday Harbor and at the University, will be open throughout the year to research workers in the above fields. Visiting research workers are welcome, and encouraged to come to the laboratories. At present there is only a limited amount of laboratory space and equipment available. All communications regarding the laboratories should be addressed to Dr. Thompson.

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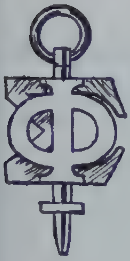

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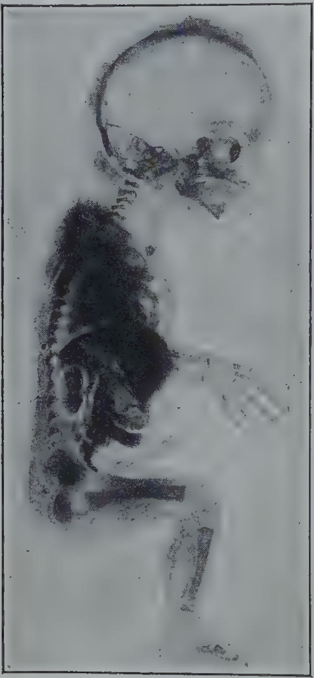

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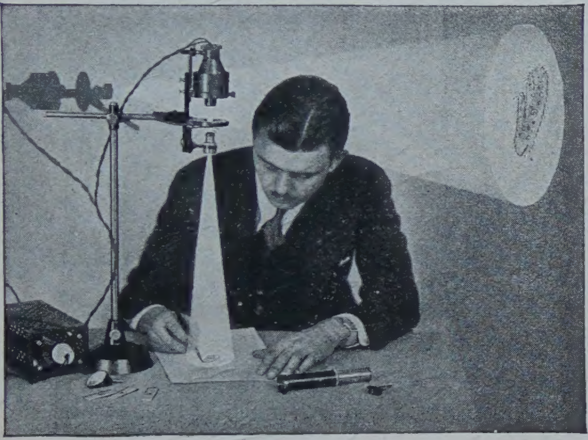

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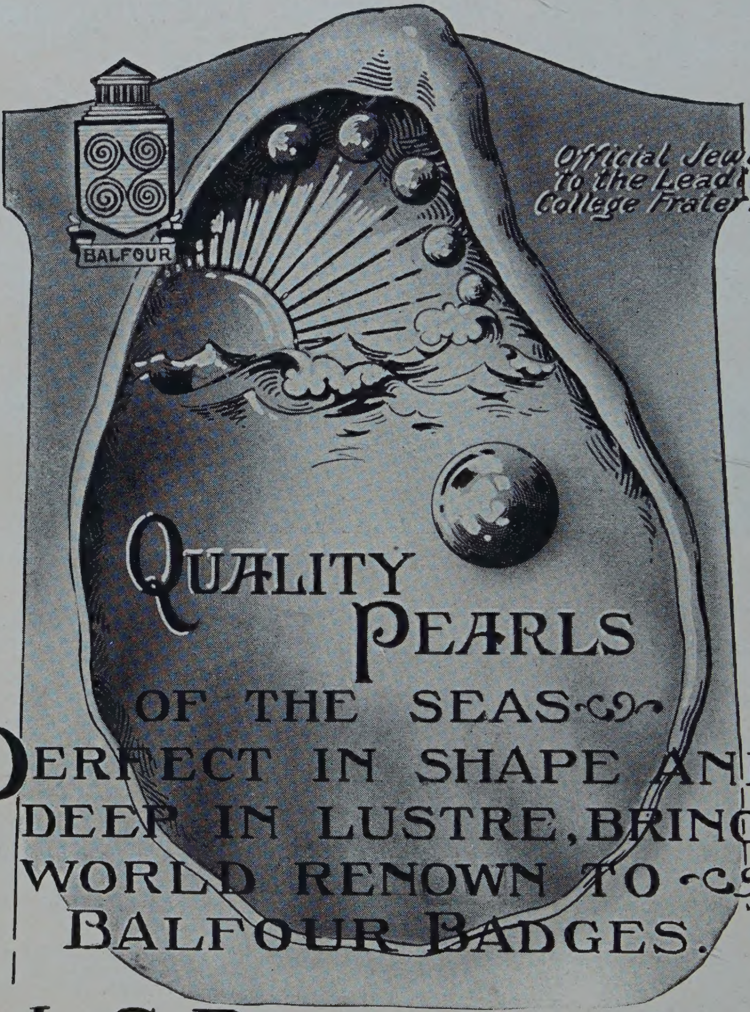

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